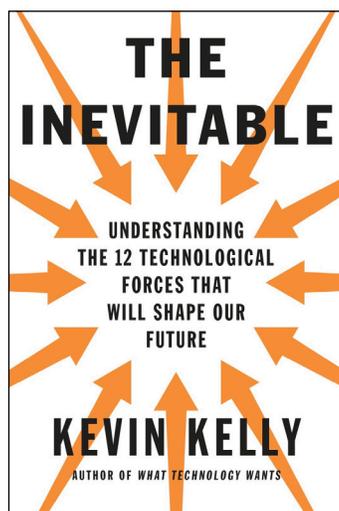


IFTF's Technology Horizons Program hosted a [conversation](#) with **KEVIN KELLY**, co-founder of Wired magazine and author of the critically acclaimed book *Out of Control*, as part of the Tech Horizons conference, [When Everything is Media](#). Kelly shared highlights from his latest book, [The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future](#).

According to Kelly, much of what will happen in the next 30 years is inevitable, driven by 12 technological trends that are already in motion today—interacting, cognifying, flowing, screening, accessing, sharing, filtering, remixing, tracking, and questioning—and “represent the metachanges in our culture for the foreseeable near future.” The directions these forces are pointing to are inevitable, but the specifics are not. For instance, the telephone was inevitable, but the iPhone was not. In his new book, Kelly explores these twelve technological forces to provide a roadmap for the future that is useful for anyone who seeks guidance on what to invent, in what to invest, how to better reach customers, and what to begin to put into place as today this new world emerges.



Cognifying

In his talk at IFTF, Kelly emphasized the technological force he terms **cognifying**—the process of embedding intelligence into inert things that could be “hundreds of times more disruptive to our lives than the transformations gained by industrialization.” This process accelerates all other disruptions outlined in the book.

According to Kelly, three recent breakthroughs are converging to usher in long-awaited artificial intelligence:

1. **Cheap parallel computation**—Initially developed for highly visual video games, today neural networks with hundreds of millions of connections between nodes can process unprecedented amounts of information at the same time.
2. **Big data** (or as IFTF calls it, abundant data)—For artificial minds with millions of nodes to improve, they need massive amounts of data to process and learn from.
3. **Better algorithms**—To process millions of nodes in a neural network, sophisticated algorithms organize them into stacked layers. Deep learning algorithms optimize the results that each layer sends to the next layers to accelerate learning and improvement.

Any device that is connected to this AI network will benefit from and contribute to its intelligence. The potential impact on the future of health is far-reaching, from patient engagement with precision communication to effective preventative care with predictive analytics. These ideas, and more, are forecasted in our most recent health research map, [Igniting Change: Innovative Care Models in the Post-ACA Decade](#).



We can expand our understanding of artificial intelligence's innovative potential for health and health care by considering Kelly's forecasts for a cognified world:

We will develop many different kinds of intelligences and entirely new ways of thinking.

The AI used to drive a car, for instance, will be very different from an AI that diagnoses illness. "While it is inevitable that we will manufacture intelligences in all that we make, it is not inevitable or obvious what their character will be. Their character will dictate their economic value and their roles in our culture." In a hyperconnected world, the ability to think differently with AI will be a source of innovation. We will only realize the full potential of big data in health when we create intelligences that can help us think at scales both unprecedentedly large, such as anticipating the spread of disease, and unprecedentedly intimate, such as deciphering the inner workings of human emotion. What other areas of health and healthcare could improve with AI as a partner?

AI will become a commodity like other utilities.

In the same way that we created an infrastructure for on-demand electrical power, we'll build "industrial-grade digital smartness" that can simply be plugged into when needed. Kelly believes this infrastructure will shape the business plans for the next 10,000 startups: take X and add AI. For instance, we see early signals of this in the

Parkinson's Voice Initiative, which uses algorithms to detect subtle changes in voice and can diagnose the earliest signs of Parkinson's Disease with 99 percent accuracy. As we continue to build more advanced forms of intelligence, we can imagine all our devices becoming passive diagnostic tools—whether we want them to or not.

You will be paid by how well you work with robots.

As we invent new ways of thinking, new AI, we will change our understanding of what sets humans apart. In particular, as we create embodied AI in the form of robots, they will begin to perform some tasks that humans complete today, especially tasks that can be measured in terms of productivity. However, Kelly believes even as AI becomes more complex, a combination of human and machine will still be better. As we did during the industrial revolution, humans will create new jobs for ourselves with a focus on those where productivity is not important—scientific exploration, innovation, art, experiences. What's different is that we'll have robots with a whole host of different types of intelligence as our partners. And, in a world where answers are a free, ubiquitous commodity from AI, knowing how to ask good questions will become the more important skill.

Pathways to Health in the Next Decade

From global pandemics to new understandings of the human microbiome, we are facing ever-more severe and complex health issues over the next decade. Addressing these challenges will require a creative mix of human and machine intelligence. To prepare for this future, IFTF's Health Futures Lab is forecasting pathways to producing health in the next decade. As healthcare continues to expand beyond the clinic, what we expect—and how we measure health and wellness—is being reinvented by individuals navigating health choices in new ways. In the next decade, every point of health interaction—whether in the home, car or clinic—will have the potential to be shaped by pervasive machine intelligence. This will create new tools for understanding persistent health inequalities and new opportunities to intervene to address root causes of health disparities.

Join our Health Futures Lab

as we explore the next decade of the global health economy.